

ESTUARIES ON MESOTIDAL SHORELINES
OF A LATE CRETACEOUS EPICONTINENTAL
SEAWAY, CANADIAN WESTERN INTERIOR,
DRUMHELLER, ALBERTA

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Upper Cretaceous siliciclastic sediments of the 100 m thick transition zone between the Bearpaw and Horseshoe Canyon Formations were deposited along the western shoreline of the Bearpaw epicontinental seaway. The lowermost unit consists of an upward coarsening and thickening sequence of prodelta, delta-front, estuarine channel, tidal flats and swamp facies. The channel-fill is 5 to 25 metres thick, and was scoured into the underlying delta front and prodelta facies. It is upward-fining, crossbedded in its lower part and parallel bedded and ripple laminated in its upper part. In the northern part of the area the channel contains northeasterly dipping point bar bedding. Overlying the channel fill is a 3 metre thick zone of ripple and flaser laminated tidal flats which is capped by a 0.5 metre thick coal. Subsurface control shows that the channel and underlying delta front facies occur in 10 kilometre wide belts oriented NNW to SSE. Paleocurrents of cross beds show complex bimodal and polymodal patterns, strongly implying tidal deposition. The channel fill was deposited in a meandering estuary, oriented NNW to SSE along a shore-line with an upper mesotidal range, where flood tides were able to transport medium- and coarse-grained sand several kilometres upstream from the mouth in the form of large scale bedforms. The process of channel filling was preceded by a transgression and followed by avulsion and swamp growth.